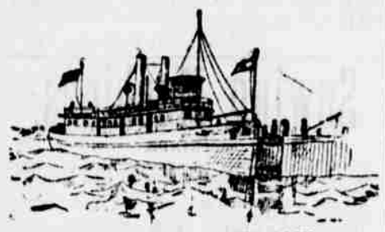
SCIENCE AND PROGRESS.

HOW A FIRE PATROL STEAMER EXTINGUISHES FLAMES.

Important Government Document on Industrial Education—Moon and Magnet. What Makes Telegraph Wires Hum. Fire Steamer Throwing Water.

Cities with long water fronts are obliged to have fire patrol boats. These are swift little steamers with powerful pumping machinery. They must put out fires upon burning steamers, upon the great wooden docks and piers, and also in the huge warehouses that are always situated close to the water front.

The model boat of this kind is said to be the Zophar Mills, of New York. That city has now two fire patrol boats. Both are quite steadily occupied. The Zophar Mills has calls on an average of every other day some months.



ZOPHAR MILLS AT THE DOCK.

The Zophar Mills is 125 feet long. When the fire boat lies at her dock her bow is pointed to the river in readiness to dart out, and all her connections with the shore are so arranged that they can be slipped and she can be out in the stream within a minute after an alarm is sounded aboard. At the bow she is held by a doubled line with the bight aboard, so that it can be thrown off instantly; the telegraph and telephone cable has a metal plug on its shore end that slips into a socket in the back of a little house like a sentry box on the pier, and can be disconnected in a second; the stern line is hitched over a snubbing post on the pier, and can be cast loose by the man who breaks the cable connection with a single motion. There is always a pressure of sixty pounds in the boilers, which is ample for immediate action.

The capacity of her main engine is 250 horse power, and her two pumping engines are thirty horse power each. With this power she can throw from each pump, when worked at the top of her ability, 1,400 gallons a minute. Her ordinary service from both pumps working together is about 2,400 gallons a minute. That seems like an enormous quantity of water to throw at a fire. At that rate she must have thrown about 23,000,000 gallons on the Bank street cotton fire during her 162 hours of work there some time ago.

THROWING WATER.

Fire boats at the seacoast cities have an advantage over others, since salt water puts out a fire sooner than fresh.

The Marine Fire company stay upon the Mills all the time, except when they go ashore for meals. Their captain is paid $1,800 a year.

A 6-inch hose pipe hurls a powerful stream of water upon the flames. Two stand pipes have been rigged upon the steamer. These are to throw water to a height. A hose leads from the pump to a stand pipe and is securely fastened to it. By means of a crank, cylinder and cog wheel the hose from which the stream plays can be elevated or turned in any direction.

The Mills can throw water three-quarters of a mile, that, too, faster than four ordinary steam fire engines will do. It is a machine of tremendous force.

In putting out fires it is found that burning cotton is most difficult to extinguish.

One of the crew of the Zophar Mills, a strong young man, has saved already, in the course of his career, seventeen lives. He has two silver medals. The fire steamer has done considerable life saving in her time, also.

Important Educational Work.

The government printing office, at Washington, occasionally issues a really valuable book. One of the best it has ever published is a large volume called "Industrial and High Art Education in the United States." It is true the omission of the word "high" from the title would improve it vastly, but still the book is valuable enough for the absurd heading, "High Art," not to count against it. The volume is a collection of educational and industrial facts. It will be the standard authority on the state of education in the United States for many years to come. The author, Col. I. Edwards Clarke, of the United States bureau of education, has put much of his life work into this enterprise. Other volumes are to follow the one already issued.

The body of the bulky book is composed of a series of papers, under the general title of "The Democracy of Art." They relate to industrial, decorative and church art in America. The progress of technical drawing in the public schools is also traced.

The work contains ample statistics and facts showing how the art movement of the country has grown. In this connection American watches, pottery work and engraving make an admirable showing.

A report is made on the governmental aid to industries in Great Britain. In brief, the book is a bundle of facts that everybody will find useful. Some of the facts are gratifying, others the reverse.

Bird-Killing Sparrows.

So much has been said of late for and against the English sparrow that the following may not be uninteresting as evidence:

Quite recently, upon the Capitol grounds, I observed a sparrow in the act of slowly killing a brown humming bird. When discovered, it had seized the struggling victim in its talons and was picking it vigorously about the head. Whenever disturbed, it caught the neck of its fluttering prey in its bill, and, after flying a few feet, alighted and renewed its bloody work. At first I supposed the victim to be a sphinx moth; but, although every attempt to release the captive was futile, the identity of the humming bird was unmistakable. Soon the first sparrow was joined by another, and then the scene of murder was carried into a copse beyond the reach of my observation.

To those who attribute the destruction of our American birds entirely to the demand for wings for ladies' hats, as well as to those who deny the quarrelsome habits of the sparrow, this piece of information may be of value.—C. D. White in Science.

The "Thompsonian" Cancer Cure.

Dr. Samuel Thompson, the founder of the Thompsonian school, grandfather of the modern eclectic, botanic and physio-medical schools, describes in his book a method of treatment which may have something in it. It is to make an extract in the following way:

Fill a brass kettle heaping full of the blossoms of the red clover, add a little water, place over a fire, and let it boil for some time; remove the heads of the clover by straining, and evaporate the liquid carefully to a solid extract. With this material he directs a plaster to be made, which acts as a caustic to the growth to which it is applied; the patient to drink freely of a tea made from the red clover blossoms.

He claims to have cured many cases of cancer in this way. No recent mention of this cancer cure appears to have been made. It certainly should be tested again, now that the difference between tumors are more readily made out than forty or fifty years ago, when Thompson flourished.

What Makes Telegraph Wires Hum?

The humming of telegraph and telephone wires, so often heard, is generally considered to be caused by the wind. Mr. R. W. McBride, of Waterloo, Ind., who specially studied the matter for several years on his private wire, which had a strong gift of humming, is satisfied that the wind is not the agent; for he found the sound more likely to be heard on a dry, clear, cool and calm evening than at any other time. He is also convinced that the sound is not produced by electricity, for he could detect no signs of that agent when the humming was going on, while at times when the wire was evidently charged there was no sound.

Rubber Horseshoe.

A St. Louis harness dealer has on exhibition a horseshoe of English design, which is simply a cushion or pad of vulcanized rubber covering the frog of the hoof and held in place by the horseshoe in an ingenious manner. In cities where there is any great quantity of asphalt pavements this invention will become invaluable, as it will prevent slipping and reduce to the minimum the concussion that soon "staves" a horse up when driven on such pavements.

Iron and Steel Axles.

A special committee on railroad axles has reported that iron axles are safer than steel axles; that all cranks should have the webs hooped; that as iron cranks appear to fail after running some 300,000 miles, and steel after 170,000, it is highly desirable that they should be taken off and not again be used on passenger engines; and that crank axles, properly constructed, are as strong as straight axles.

Facts of Interest.

The Sandwich Islands are twelve in number.

Our students in American colleges are not increasing in proportion to the population.

A great volcanic chain girdles the Pacific ocean through western America, the Asian coast and the islands.

Persons who are troubled with palpitation of the heart or have attacks of nervous excitement of the circulation should not use tea or coffee.

Brown Sequard says: "Coughing is a natural, reflex action, wholly unintelligent. Not much is needed when it can do any good at all. When it cannot do any good it should be resisted.

An iron tower 984 feet high is to be erected on the grounds of the coming Paris international exhibition. The tower will be supported by four pillars. The structure will cost $1,000,000, and will be surmounted by a powerful electric light.

EARLY FALL FASHIONS.

Fall Outer Wraps.

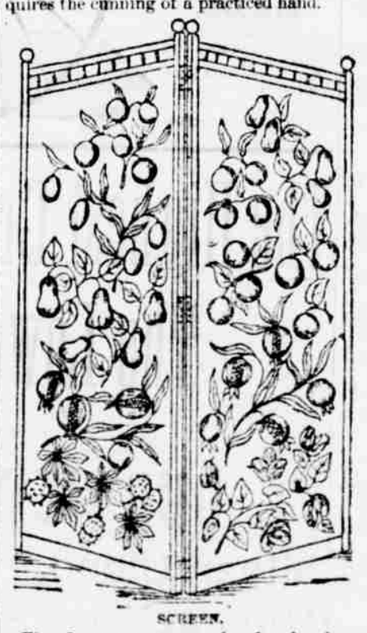
A novelty for an outer garment is a "pelerine mantelet" of gray faille, trimmed with gold beads. The collar is covered with gold fringe, fastened down to the goods, and the plastron is covered with gilt beads. Another gray garment, destined for traveling use, has a very peculiar sleeve. It falls wide and flat from the shoulder, and is drawn in about six inches above the wrist by a bracelet of gray passementerie. The skirt of the confection is long, and gathered in the back under a passementerie ornament. Down the front of the garment is a bias piece of silk.

Embroidery Patterns.

Here are some South Kensington embroidery patterns for our lady readers who do fancy work. They are from real designs used in the Royal School of Art Needlework.

MANTEL VALANCE.

Fig. 1 shows a mantel valance of dark blue velvet, the handsome and graceful design of which is executed in "laid work;" it is quite solid, the silk being laid on and stitched down in rows; in this instance it is unshaded, the leaves being in green, and the sprays in lovely pale colors. There are some specimens in the school in which the silk is laid in shades, which are still more attractive in appearance, but the embroidery of which requires the cunning of a practiced hand.



SCREEN.

Fig. 2 represents panels of a handsome screen. The screen itself has four panels, joined like the two given. It is mounted in a black frame, the ground is of Indian red cloth, very rich and soft in texture, and the design is formed of numerous sprays of fruit, apples, pears, plums, oranges, pomegranates, etc., and branches of horse chestnut and hazel nuts, in various stages of fruiting. The execution of this is wonderfully natural; it is done throughout in applique, the fruits being of plush and velvet raised and rounded from the surface by the insertion of cotton-wool underneath, while the leaves are of various shades of green serge laid on flat, the veins and markings of leaves and fruit are worked in with crewel, and the entire design is first outlined with Japanese gold threads, and secondly with coarse green crewel, which is "couched" on, and which serves to throw out the pattern in strong relief. Fig. 3 is a handsome and striking footstool of rectangular shape. It is of olive green velveteen worked in a conventional design of brown and gold color. Many ladies now understand the Kensington stitch well, and the designs need no further explanation.

FOOTSTOOL.

The Coming Colors.

Navy blue and brown will be the colors most generally worn next season. This is plainly shown in the importations of cloths, velvets and other dress goods, in dress trimmings and in all millinery goods. With the purplish marine blues cardinal red will be restored for contrasts, while the brighter poppy reds will be used with the new olives, which have more green than the brownish and yellow tinted olive shades of last year. Black will be restored to the favor it formerly had for young and old alike, and which it has never really lost with rich women who can afford to wear the costliest black fabrics. The new blue shades are Salammbo and serpente and canard, with gray and green tints in them, yet entirely different from the peacock blues or the cadet gray blue of past seasons. The new browns are rosewood and mure (mulberry) for very dark shades, with lighter capucine, cafe and maroon tints, while for the red browns are Etruscan and Acajou or mahogany. Dahlia and heliotrope and plum shades are in great favor with French women, and will make refined costumes of cloth or velvet, while for lighter dresses for the house are Ophelia and mauve shades of cashmere, with softly repped faille or velvet in combination. Gobelin is another name given to the Salammbo blue tints. Suede, salmon, corn and rose are the pale shades most seen, while there are various shades of green—chartreuse, pistache and moss—with dull vieux rouge and other more vivid red shades already noted.—Bazar.

Double Skirts.

Second skirts, which are seen on almost all costumes, are arranged in different ways. Some of them have irregular folds, while with others the underskirt is plain and the tunique plaited and much trimmed. Some plaited tuniques are longer in front than on the sides, and are surrounded with galloon or trimmed with lace, thus forming a kind of plaited apron. This is only fastened to the skirt by the upper drapery. Another tunique is cut the same length on either side and raised gradually to show the underskirt. A pretty way of arranging a suit is to take a worsted etamine skirt in dark blue open work, for example, over a light blue taffetas or faille underdress. The etamine skirt is as long as the silk one, and is raised on one side under a dark blue passementerie ornament. A blue jersey, in the color of the etamine, is worn with this dress.—New York Times.

Autumn Millinery.

Light hats are abandoned for those of dark blue or brown or black rough straw, and fruits, feathers and birds take the place of flowers for their trimmings. Thus, instead of a white sailor hat with white wings and puffs of muslin spread like sails, there are now dark blue sailor hats with two bands of inch-wide gros grain ribbon around the crown tied in quaint little bows on the side, and a great cluster of blue plums, or damsons, or blackberries is massed in the front to rest on some high forked ends of ribbon; brown hats have peaches or grapes with their bloom upon them, and black hats have luscious currants, red, white and black, with bands of red or black watered ribbon. Still later, fancy feathers and birds will be added, and as it is quite English to wear these straw hats throughout the autumn the fashion will be adopted here.—Harper's Bazar.

For Riding and Driving.

Some remarkably neat little riding jackets and driving capes, very suitable for the time of year, have been just brought out in London. Covert coats are now worn by ladies, not only for riding and driving, but for walking also. One of the newest driving capes deserves description. It is of either canvas lined with silk, or else of plain thin cloth, which is generally rendered waterproof. It has three capes, the lowest having sling sleeves, which are lined with silk, contrasting in color with the cloth. For practical purposes, however, a driving jacket is preferable to this form of cape, as giving greater freedom to the arms, and affording more protection against the weather.—Cloak and Suit Review.

Opals.

There is good authority for stating that the opal—a magnificent gem too long neglected because of the foolish superstition of late years associated with it—is growing in favor abroad and is likely to come to the front here. As the opal is the only precious stone which defies imitation, and fine specimens are of rare occurrence, there appears no good reason why opals should not recover the high favor they held previous to the publication of Sir Walter Scott's novel, "Anne of Geierstein," in which romance is ascribed to this stone a supernatural power to bring bad luck. Previous to the appearance of this fiction the opal enjoyed its original character of being a love stone and suitable for a betrothal gage.

The Hair.

It seems as though the good sense of many ladies might prevail against the combined efforts of hair dressers and hair importers, so zealously do they cling to a becoming mode when one is found to suit them; and in this season of general rather than particular styles, ladies are justified in retaining one which becomes them.

The hair piled loosely upon the top of the head and fringed in front in the present fashion, is more generally becoming to women than any one other style. It is also neater and healthier, leaving the back of the head open to the air.

Velvets.

Plain velvets come in all the new colors, also repped or epingle in cross stripes alternating with plain velvet. The novelty is in the petits pois or pea-dotted velvets, with small spots embroidered on them in contrasting colors, such as currant red wrought on Salammbo blue, or navy blue, or green, and also in tone upon tone, especially in brown shades, such as Suede dots on bois de rose, the new rosewood shade.

FASHIONLETS.

Felt and velvet bonnets will be the leading features of winter millinery.

Shot, changeable, or even striped silks are now worn as the under fabric of lace dresses.

Jet and beaded bonnets generally will be worn for dress during the next three months. At present these are trimmed with colored tulle, notably green, yellow and red.

YOUNG FOLK'S COLUMN.

HOW AN INDIAN SQUAW TEACHES HER PAPOOSE TO SWIM.

Imitate a Frog and You Will Hit the True Stroke—Some Advice From Mr. Gus Sundstrom, the Champion Swimmer—Riddles.

Many boys and girls are learning to swim this summer, and those who are not ought to be. The first thing to be done is to overcome one's terror of the water. A good way to do that is to put the whole head under water and keep it there with the eyes open for a second or two, holding the breath. The next thing to be remembered is that one must lie nearly flat upon his breast near the top of the water, thus making it support him. The more flat surface one can throw upon the water the better it will hold him up.

Then remember how a frog swims. Watch one do it, if you have never done so, and study his motions carefully. Men and frogs are shaped alike. Imitate the frog when you try to swim.

The picture will show you how Indian squaws teach their young ones to swim. All Indians, old and young, male and female, can swim like fish.

THE INDIAN WAY.

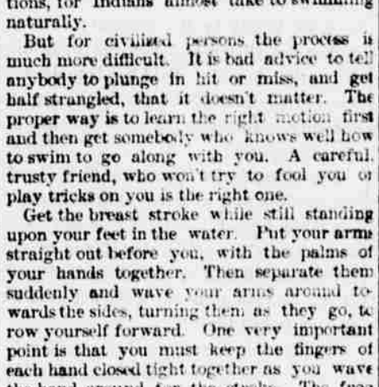
When a papoose is no more than 2 years old its mother dumps it into the water and lets its kick for itself. She has a band tied around it under the arms and holds it up by the back, just as the water will not strangle it. In this way it very shortly gets the motions, for Indians almost take to swimming naturally.

But for civilized persons the process is much more difficult. It is bad advice to tell anybody to plunge in hit or miss, and get half strangled, that it doesn't matter. The proper way is to learn the right motion first and then get somebody who knows well how to swim to go along with you. A careful, trusty friend, who won't try to fool you or play tricks on you is the right one.

Get the breast stroke while still standing upon your feet in the water. Put your arms straight out before you, with the palms of your hands together. Then separate them suddenly and wave your arms around towards the sides, turning them as they go, to row yourself forward. One very important point is that you must keep the fingers of each hand closed tight together as you wave the hand around for the stroke. The frog has the advantage of the man here, for his fingers are webbed and held together already. A fine thin membrane grows between them. Practice until you get the breast stroke very thoroughly. You will need to go into the water many, many times, probably, before you can swim, but never get discouraged. It will come by and by. Often ladies and gentlemen learn long after they are full grown.

The next is the leg stroke, or kicking out. This is more difficult, that is it is difficult to get the legs and arms to work together. On this point Mr. Gus Sundstrom, the champion swimmer, says:

"Kick out as your arms are being extended for a stroke, and draw up your legs while making the stroke. That is the moment at which to get your breath, as the water is then smooth in front of you, and less apt to get into your mouth. It is well to accustom yourself to breathe only at every third stroke, as it will help you very much in rough water. In kicking out, strike the soles of your feet against the water, as though you were pushing yourself up in bed. Spread your legs far apart as you kick, and then, when they are fully extended, comes an important point in swimming. Do not jerk them up for another kick, as ignorant swimmers do, but draw them tight together, as though your legs were a pair of shears with which you wanted to cut the water. By thus closing your legs on the water you will add almost as much to your speed as by the first kick. In swimming upon the back the legs do most of the work.



SWIMMING UPON THE BACK.

Kick out with them as in the breast stroke, and paddle with your hands at the same time to keep afloat. When you become expert you can learn to swim very rapidly on the back by stretching your hands straight out above your head, lifting your arms from the water to do so, and then bringing them down to your sides with a long, powerful sweep through the water."

Hidden Ports.

1. I sternly bade Harry to withdraw, or use words worth listening to. 2. Are you going to the place by land or water? 3. The dessert will be composed of cakes, which are browning beautifully beside the fire. 4. The teacher is so cross that no one knows how Elsie manages to please her. 5. The south eyrie is the haunt of the fierce eagles. 6. Lucy will read the chapter to her aunt.

CHARLIE B.

Grandmother's Story.

Now hang up your sun bonnet, Martby,
And get out your patchwork square,
And sit down here and sew for a while
In your little rocking chair.

And hear me tell you a story
Of a little girl I know,
Who made a whole quilt of patchwork
When she wasn't as big as you.

—Wide Awake.

What Adam Said.

When Adam first saw Eve in the garden of Eden, it is said he made a remark which reads the same whether you spell it backwards or forwards. It was: "Madam, I'm Adam."